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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/521,150

07/29/2005

Alexander Gorban

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EXAMINER

DAVIS, MARY ALICE

ART UNIT

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3748

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,150	Applicant(s) GORBAN, ALEXANDER	
	Examiner MARY A. DAVIS	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the screw surfaces are non-cylindrical and radially limit the conjugated elements (claims 1, 12, and 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 3748

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1, 12, and 14 have been amended to include the limitation to "the screw surfaces are non-cylindrical and radially limit the conjugated elements. The applicant's response dated June 6, 2008 states that screw apparatus are known in the art and refers to references US 5,439,359, US 3,975,120, and FR-A-997957. FR-A-997957 has never been submitted to the Examiner in an IDS, and is therefore, not considered. The U.S. references US 5,439,359 and US 3,975,120 reveal a single set of conjugate elements and not two sets of conjugate elements. The Examiner has referenced two different patents (MOINEAU (U.S. Patent 2,085,115) and ROMANYSZYN JR (U.S. Patent 5,108,273)), which show two screw conjugate sets. In MOINEAU there are one inlet and one outlet with both fluids being moved in the same direction. In ROMANYSZYN JR there are two inlets and one outlet, and fluid is moved and pumped along different directions when moving in the chambers formed between the conjugate elements. When the applicant claims "non-cylindrical" are they referring to a helical formation (see ROMANYSZYN JR) or a helical formation that is cone shaped (see MOINEAU)? How does the working fluid enter and exit the apparatus? What does the applicant mean by "non-cylindrical"? What does the cross section of the

applicant's apparatus look like, which shows the "non-cylindrical" apparatus? What does the applicant mean by the limitation to "radially limit the conjugate elements"? Furthermore, limitations should be stated in the positive, such as helical surfaces extending along the axis of rotation.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-7 and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over BRODOV ET AL (Russian Patent No. 2,140,018 C1) in view of any one of the following MOINEAU (U.S. Patent 2,085,115), ROMANYSZYN JR (U.S. Patent 5,108,273), or LEROY ET AL (U.S. Patent 5,439,359), as currently understood by the Examiner.

Regarding claim 1, BRODOV ET AL discloses:

- A method of transforming a motion in a volume screw machine, said machine having at least two sets of conjugated elements (28, 27; 5,1), each set comprising a first element (28, 5) having an inner screw surface (29, 5) centered around a first axis (passing through centre O) and a second element (27,1) having an outer screw surface (27, 1) centered around a second axis (passing through centers O₂, O₁), wherein an inner set (1,5) of conjugated elements is placed coaxially in at least one cavity of the second element of an outer set

(28,27, see Figure 2) of conjugated elements, wherein the first and second axes (passing through centers O; O₁, O₂) are parallel (Page 6, lines 13-21; Page 10, lines 21-30) and wherein at least one of said first and second elements of each set is rotatable about its axis (Page 11, lines 8-11), said method comprising:
creating a rotary motion of at least one element in each set (Page 11, lines 1-11).

Regarding claim 2, BRODOV ET AL discloses:

- the rotary motion of said at least one element in each set is synchronized in such a manner as to provide for a dynamically balanced machine (Page 11, lines 7-13; Page 6, lines 22-23, it is inherent that if the rotary motion is synchronized that the machine is dynamically balanced).

Regarding claim 3, BRODOV ET AL discloses:

- each set comprises an element centered about an axis which coincides with a principal axis of the machine (see Figure 2), and wherein the respective second element of each set is centered about an axis which is not coinciding with the principal axis (see Figure 2 showing centers O₁, O₂), wherein the non-coinciding axes are rotated in such a manner about the principal axis as to maintain the distance relationship of the non-coinciding axes with regard to each other and with regard to the principal axis (see Figure 2, Page 11, lines 7-13 (θ_2). It is inherent that an element that has a planetary motion around another element that there would be a distance relationship maintained with regard to the other element.)

Regarding claim 4, BRODOV ET AL discloses:

- said first axes of each set of conjugated elements coincide, whereas the second axes are non-coinciding, or that said second axes of each set of conjugated elements coincide whereas the first axes are non-coinciding (see Figure 2), and that the non-coinciding axes (passing through centers O_1 , O_2) are rotated in such a manner about the coinciding axes (passing through centre O) as to maintain the distance relationship of the non-coinciding axes (passing through centers O_1 , O_2) with regard to each other and with regard to the coinciding axes (passing through center O).

Regarding claim 5, BRODOV ET AL discloses:

- a motion of the elements of different sets of conjugated elements about their respective axes is synchronized (the apparatus being synchronized is disclosed, see Page 11, lines 7-13).

Regarding claim 6, BRODOV ET AL discloses:

- a first group of rotations comprising:
 - a) the rotation of the first element of one set of conjugated elements about the first axis (Page 11, lines 7-13, see Figure 2, it is inherent that the first element rotates about a first axis (O_1)),
 - b) the rotation of the second element of one set of conjugated elements about the second axis (see Figure 2, it is inherent that the second element rotates about a second axis (O_2)), and
 - c) a rotation of the first axis about the second axis or a rotation of the second axis about the first axis, at least two rotations are mechanically synchronized each

with a respective one of a second group of rotations comprising (Page 11, lines 7-13)

- d) the rotation of the first element of another set of conjugated elements about the first axis (see Figure 2 (O_1)), and
- e) the rotation of the second element of another set of conjugated elements about the second axis (see Figure 2 (O_2)).

Regarding claim 7, BRODOV ET AL discloses:

- first and second sets of conjugated elements each comprise a planetarily moving element, and wherein the rotations of the axes of the planetarily moving elements of the first and second sets are synchronized, and wherein the rotations of the planetarily moving elements about their respective axes are synchronized (Page 11, lines 7-13, Page 15, lines 18-31).

Regarding claim 9, BRODOV ET AL discloses:

- a first set of conjugated elements comprises a planetary motion and a second set of conjugated elements comprises a differential motion, and wherein rotations of the axes of the first elements of the first and second sets are synchronized, and wherein rotations of the axes of the second elements of the first and second sets are synchronized (Page 11, lines 7-13).

Regarding claim 10, BRODOV ET AL discloses:

- a first set of conjugated elements comprises a planetary motion and a second set comprises a synchronization coupling link for providing a differential motion, and wherein a rotation of the axis of an element of the first set of conjugated

elements is synchronized with a rotation of the synchronizing coupling link of the second set of conjugated elements (Page 11, lines 7-13).

Regarding claim 11, BRODOV ET AL discloses:

- curvilinear inner surfaces (29, 31, near 1 of Figure 2) of the first elements (28, 27, 5) are put into mechanical contact with curvilinear outer surfaces (27, 30, 1) of the second elements (27, 5, 1), thereby carrying out said motion transfer (Page 10, line 15 - Page 11, line 13).

Regarding claim 12, BRODOV ET AL discloses:

- A volume screw machine of rotary type, comprising at least two sets of conjugated elements (28, 27; 5, 1), each set comprising a first element (28, 5) having an inner screw surface (29, 5) and enclosed therein a second element (27,1) having an outer screw surface (27, 1), said machine comprising an outer set of conjugated elements (28, 27) and at least one inner set of conjugated elements (5,1), wherein each inner set of conjugated elements (5,1) is placed in a cavity of an element (27) of another set of conjugated elements (28, 27).

Regarding claim 13, BRODOV ET AL discloses:

- rotatable elements of the different sets of conjugated elements are mechanically coupled to each other such as to provide for a synchronized motion of said elements (Page 11, lines 7-13).

Regarding claim 14, BRODOV ET AL discloses the claimed limitations as discussed above (see claims 1 and 3).

However, BRODOV ET AL fails to disclose the screw surfaces are non-cylindrical and radially limit the conjugated elements. From the applicant's response dated June 6, 2008, the claim limitations to "the screw surfaces are non-cylindrical and radially limit the conjugated elements" is construed by the Examiner that the screw surfaces along the axially length of the apparatus are helical, and therefore, are non-cylindrical where the conjugated elements are radially limited at different locations along the axis.

MOINEAU, ROMANYSZYN JR, and LEROY ET AL teach screw surfaces are non-cylindrical and radially limit the conjugated elements (see Figures 1-7 of MOINEAU; see Figures 1-5 of ROMANYSZYN JR; see Figures 23-26 of LEROY ET AL, which shows similar profiles of a "cylindrical" version (Figures 25-26) and a "non-cylindrical" version (see Figures 23-24) of the apparatus).

It would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have screw surfaces that are non-cylindrical and radially limit the conjugate elements in the apparatus of BRODOV ET AL, in order to increase the output of the apparatus or to provide a constant mixed ratio utilizing a single apparatus (Abstract of ROMANYSZYN JR). Furthermore, according to the applicant's response "a rotary screw machine of three-dimensional type of that kind is known from US 5,439,359" (Page 8 of applicant's response dated June 6, 2008), therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have made the apparatus of BRODOV ET AL with screw surfaces that are non-cylindrical and radially limit the conjugate elements, since it requires only routine skill in the art to modify the BRODOV ET AL to create a three-dimensional apparatus with non-cylindrical

surfaces. In addition, applying a known technique of forming a conjugate element in a non-cylindrical manner to a known device would yield predictable results.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over BRODOV ET AL.

BRODOV ET AL discloses the method to generate differential and planetary motion in conjugate elements (Page 2, line 3+). However, BRODOV ET AL fails to disclose two sets of conjugate elements comprising differential motion. BRODOV ET AL teaches how to generate differential motion in a single set of conjugate elements (Page 8, line 15+). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have differential motion in both sets of conjugate elements, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. Furthermore, the modified apparatus of BRODOV ET AL appears to be capable of having the two sets of conjugate elements having differential motion.

Response to Arguments

8. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection necessitated by applicant's amendment.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARY A. DAVIS whose telephone number is (571)272-9965. The examiner can normally be reached on Monday thru Thursday; 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas E. Denion/
Supervisory Patent Examiner, Art Unit 3748

/Mary A Davis/
Examiner, Art Unit 3748